

**REMARKS**

In view of the following discussion, the Applicants submit that none of the claims now pending in the application is directed to non-statutory subject matter under the provisions of 35 U.S.C. §101 or is unpatentable under the provisions of 35 U.S.C. §103. Thus, the Applicants believe that all of these claims are now in allowable form.

**I. OBJECTION TO CLAIM 1**

Claim 1 stands objected to for informalities. In response, the Applicants have amended claim 1 in order to more clearly recite aspects of the present invention.

In particular, the Examiner submits that "the use of the phrase 'is used to' is considered ... to be interpreted as *intended use*" and therefore renders the recited functionality optional (Office Action, Page 2, emphasis in original). In response, the Applicants have deleted the limitation of "wherein the single feature vector is used to cluster ..." from claim 1. As such, the Applicants submit that all remaining limitations of claim 1 are positively recited.

In light of the above amendment, the Applicants respectfully request that the objection to claim 1 be withdrawn.

**II. OBJECTION TO THE SPECIFICATION**

The Specification stands objected to for informalities. Specifically, the Examiner alleges that there is "insufficient antecedent basis for [the limitation of 'a computer readable storage medium'] ... in the specification." In response, the Applicants have amended claims 26-28 to more clearly recite aspects of the present invention.

In particular, the Applicants have amended claims 26-28 to recite a "computer readable storage device," replacing "a computer readable storage medium." Support for this amendment may be found at least in paragraphs 0086-0087 of the Specification and in Figure 2. These portions of the Specification describe, for example, a computer 200 including a processor 210 and a memory (i.e., storage device) 220. The memory 220 further includes control programs 221, clustering algorithms 222, and data

structures 223. The processor 210 cooperates with conventional support circuitry 230 that assist in executing the software routines stored in the memory 220. These paragraphs go on to specify that "it is contemplated that some of the process steps discussed herein as software processes may be implemented within hardware, for example, as circuitry that cooperates with the processor 210 to perform various steps, or stored on a computer readable medium" (emphasis added). As such, the Applicants submit that the Specification clearly supports the recited feature of a "computer readable storage device."

In light of the above, the Applicants respectfully request that the objection to the Specification be withdrawn.

### **III. REJECTION OF CLAIMS 26-28 UNDER 35 U.S.C. § 101**

Claims 26-28 stand rejected under 35 U.S.C. §101 as allegedly being directed to non-statutory subject matter. In response, the Applicants have amended claims 26-28 in order to more clearly recite aspects of the invention.

In particular, the Applicants have amended claims 26-28 to recite a "computer readable storage device," replacing "a computer readable storage medium." As discussed above, a computer readable storage device could be, for example, a memory, as illustrated in Figure 2 and described in paragraphs 0086-0087 of the Applicants' Specification. A computer readable storage device is clearly a tangible, non-transitory medium, which falls into at least one of the four categories of invention (e.g., machine or manufacture). As such, the Applicants submit that the subject matter recited in claims 26-28 is clearly statutory within the meaning of 35 U.S.C. §101.

In light of the above, the Applicants respectfully request that the rejection of claims 26-28 under 35 U.S.C. §101 be withdrawn.

### **IV. REJECTION OF CLAIMS 1-5, 7-10, AND 21-28 UNDER 35 U.S.C. § 103**

#### **A. Claims 1, 22, and 24**

Claims 1, 22, and 24 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the Harmer et al. article ("Mobile Aware Multimedia Applications for

UMTS: The ACTS *On The Move* Project," hereinafter "Harmer") in view of the Schuetze et al. patent (United States Patent No. 6,922,699, issued July 26, 2005, hereinafter "Schuetze"). In response, the Applicants have amended independent claim 1 in order to more clearly recite aspects of the present invention.

Primarily, the Applicants respectfully submit that Harmer and Schuetze fail, singly or in any permissible combination, to disclose or suggest the creating a single (i.e., unified) feature vector based on a user's communication interest, on network attributes, and on application attributes, such that the single feature vector comprises features extracted from a plurality of different types of sources, as recited by Applicants' independent claim 1.

By contrast, Harmer at best discloses creating three separate profiles, namely, a user profile, a terminal profile, and a network profile (See, Harmer, Page 540, "Mobile Application Support Environment – MASE"). Harmer further discloses that the three profiles are updated individually (See, Harmer, Page 540, "Mobile Application Support Environment – MASE": "Only the user profile can be updated via the Mobile-API. Terminal and network profiles are updated by MASE managers."). If the profiles can be updated individually, then it follows that the profiles are not combined into a single data structure or otherwise dependent on each other. Thus, a single functional or computational entity that manages three individual data structures (profiles) is not equivalent to a single feature vector, as claimed by the Applicants. Moreover, the Applicants note that nowhere in Harmer is it actually disclosed that the three profiles are combined into a single data structure or feature vector.

Schuetze discloses representing documents in a document collection as vectors in a multi-dimensional vector space (Schuetze, Abstract). The resultant vector, however, represents merely a profile of a single document (See, e.g., Schuetze, column 11, lines 39-42: "a single content vector representative of the document"). That is, all of the features that are combined in a given vector come from not just a single type of source, but a single source (i.e., a single document). For example, Schuetze discloses that the features that may be incorporated in the vector include: text content, document

link, inlinks, outlinks, text genre, image color histogram, and image complexity (Schuetze, column 10, lines 43-46). Thus, a document content vector comprising the features of a single document is not equivalent to a single content vector that comprises features extracted from a plurality of different types of sources. Moreover, the Applicants note that nowhere in Schuetze is it actually disclosed that features from multiple types of sources are combined into a single data structure or feature vector.

As such, Harmer in view of Schuetze fails to disclose or suggest creating a single (*i.e.*, unified) feature vector based on a user's communication interest, on network attributes, and on application attributes, such that the single feature vector comprises features extracted from a plurality of different types of sources, as recited by Applicants' independent claim 1. Specifically, the Applicants' independent claim 1 positively recites:

1. A method of constructing a multi-type feature vector comprising:  
obtaining a communication interest of a user as represented by at least one of: a user request for a content update or a user subscription to a specific data item or to a set of proximal data sources;  
obtaining network attributes;  
obtaining application attributes; and  
forming a single feature vector based on the communication interest, network attributes, and application attributes, such that the single feature vector comprises features extracted from a plurality of different types of sources.  
(Emphasis added)

As discussed above, Harmer in view of Schuetze fails to disclose or suggest creating a single (*i.e.*, unified) feature vector based on a user's communication interest, on network attributes, and on application attributes, such that the single feature vector comprises features extracted from a plurality of different types of sources, as recited by Applicants' independent claim 1. Accordingly, the Applicants submit that independent claim 1 is not unpatentable over Harmer in view of Schuetze and is allowable.

Claims 22 and 24 depend from independent claim 1 and recite at least all of the same features recited in independent claim 1. As such, the Applicants submit that claims 22 and 24 are allowable for at least the same reasons that independent claim 1 is believed to be allowable.

In light of the above, the Applicants respectfully request that the rejection of claims 1, 22, and 24 under 35 U.S.C. §103 be withdrawn.

**B. Claims 2, 7, 9, and 26**

Claims 2, 7, 9, and 26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Harmer in view of the George et al. patent (United States Patent No. 6,944,645, issued September 13, 2005, hereinafter "George") and further in view of Schuetze. In response, the Applicants have amended independent claims 2 and 26 in order to more clearly recite aspects of the present invention.

As discussed above, Harmer in view of Schuetze fails to disclose or suggest creating a single (*i.e.*, unified) feature vector based on a user's communication interest, on network attributes, and on application attributes, such that the single feature vector comprises features extracted from a plurality of different types of sources, as recited by Applicants' independent claims 2 and 26. George fails to bridge this gap in the teachings of Harmer and Schuetze. George teaches a method and system for customizing electronic communications. However, in a previous Office Action, the Examiner acknowledged that George (in combination with another reference) "do[es] not explicitly teach the steps of: forming a single feature vector based on the communication interest, network attributes, and application attributes, wherein the single feature vector is used to cluster the user with one or more other users based on similarly-formed single feature vectors associated with one or more other users" (Office Action dated April 2, 2009, Page 5).

As such, Harmer in view of George and further in view of Schuetze fails to disclose or suggest creating a single (*i.e.*, unified) feature vector based on a user's communication interest, on network attributes, and on application attributes, such that the single feature vector comprises features extracted from a plurality of different types of sources, as recited by Applicants' independent claims 2 and 26. Specifically, the Applicants' independent claims 2 and 26 positively recite:

2. A method of clustering a multi-type vector space comprising:  
obtaining network attributes from a network having a plurality of nodes;  
obtaining application attributes of an application;  
obtaining user's communication interest as represented by at least one of:  
a user request for a content update or a user subscription to a specific data item  
or to a set of proximal data sources;  
forming a plurality of feature vectors, one for each of the plurality of nodes,  
where each single one of the plurality of feature vectors is based on the user's  
communication interest, network attributes, and application attributes, such that  
each single one of the plurality of feature vectors comprises features extracted  
from a plurality of different types of sources; and  
clustering the plurality of nodes based on the plurality of feature vectors.

(Emphasis added)

26. A computer readable storage device containing an executable program for clustering a multi-type vector space, where the program performs steps comprising:

- obtaining network attributes from a network having a plurality of nodes;
  - obtaining application attributes of an application;
  - obtaining user's communication interest as represented by at least one of:  
a user request for a content update or a user subscription to a specific data item  
or to a set of proximal data sources;

forming a plurality of feature vectors, one for each of the plurality of nodes,  
where each single one of the plurality of feature vectors is based on the user's  
communication interest, network attributes, and application attributes, such that  
each single one of the plurality of feature vectors comprises features extracted  
from a plurality of different types of sources; and

clustering the plurality of nodes based on the plurality of feature vectors.

(Emphasis added)

As discussed above, Harmer in view of George and further in view of Schuetze fails to disclose or suggest creating a single (i.e., unified) feature vector based on a user's communication interest, on network attributes, and on application attributes, such that the single feature vector comprises features extracted from a plurality of different types of sources, as recited by Applicants' independent claims 2 and 26. Accordingly, the Applicants submit that independent claims 2 and 26 are not unpatentable over

Harmer in view of George and further in view of Schuetze and are allowable.

Claims 7 and 9 depend from independent claim 2 and recite at least all of the same features recited in independent claim 2. As such, and for at least the reasons stated above with respect to independent claim 2, the Applicants respectfully submit that claims 7 and 9 are also not unpatentable over Harmer in view of George and further in view of Schuetze.

In light of the above, the Applicants respectfully request that the rejection of claims 2, 7, 9, and 26 under 35 U.S.C. §103 be withdrawn.

#### C. Claim 8

Claim 8 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Harmer in view of George and Schuetze and further in view of the Grimm et al. patent (United States Patent No. 5,828,843, issued October 27, 1998, hereinafter "Grimm"). In response, the Applicants have amended independent claim 2, as discussed above, in order to more clearly recite aspects of the present invention.

As discussed above, Harmer in view of George and further in view of Schuetze fails to disclose or suggest creating a single (i.e., unified) feature vector based on a user's communication interest, on network attributes, and on application attributes, such that the single feature vector comprises features extracted from a plurality of different types of sources, as recited by Applicants' independent claim 2. Moreover, the Examiner acknowledged in a previous Office Action that Grimm (in combination with George) "do[es] not explicitly teach the steps of: forming a single feature vector based on the communication interest, network attributes, and application attributes, wherein the single feature vector is used to cluster the user with one or more other users based on similarly-formed single feature vectors associated with one or more other users" (Office Action dated April 2, 2009, Page 5). Thus, Grimm fails to bridge the gap in the teachings of Harmer, George, and Schuetze. As such, the Applicants respectfully submit that independent claim 2 is also not unpatentable over Harmer in view of George and Schuetze and further in view of Grimm.

Claim 8 depends from independent claim 2 and recites at least all of the features recited in independent claim 2. As such, and for at least the reasons stated above with respect to independent claim 2, the Applicants respectfully submit that claim 8 is also not unpatentable over Harmer in view of George and Schuetze and further in view of Grimm and is allowable.

In light of the above, the Applicants respectfully request that the rejection of claim 8 under 35 U.S.C. §103 be withdrawn.

#### **D. Claims 3-4 and 27-28**

Claims 3-4 and 27-28 stand rejected under 35 U.S.C. §103(a) as being unpatentable Harmer in view of George and Schuetze and further in view of the Johnson patent (United States Patent No. 6,078,946, issued June 20, 2000, hereinafter "Johnson"). In response, the Applicants have amended independent claims 2 and 26, as discussed above, in order to more clearly recite aspects of the present invention.

As discussed above, Harmer in view of George and further in view of Schuetze fails to disclose or suggest creating a single (*i.e.*, unified) feature vector based on a user's communication interest, on network attributes, and on application attributes, such that the single feature vector comprises features extracted from a plurality of different types of sources, as recited by Applicants' independent claims 2 and 26. Johnson fails to bridge this gap in the teachings of Harmer, George, and Schuetze. As such, the Applicants respectfully submit that independent claims 2 and 26 are also not unpatentable over Harmer in view of George and Schuetze and further in view of Johnson.

Claims 3-4 and 27-28 depend, respectively, from independent claims 2 and 26 and recite at least all of the features recited in independent claims 2 and 26. As such, and for at least the reasons stated above with respect to independent claims 2 and 26, the Applicants respectfully submit that claims 3-4 and 27-28 are also not unpatentable over Harmer in view of George and Schuetze and further in view of Johnson and are allowable.

In light of the above, the Applicants respectfully request that the rejection of claims 3-4 and 27-28 under 35 U.S.C. §103 be withdrawn.

**E. Claim 5**

Claim 5 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Harmer in view of George and Schuetze and further in view of the Solotorevsky et al. patent application (United States Patent Application Publication No. 2005/0010571, published January 13, 2005, hereinafter "Solotorevsky"). In response, the Applicants have amended independent claim 2, as discussed above, in order to more clearly recite aspects of the present invention.

As discussed above, Harmer in view of George and further in view of Schuetze fails to disclose or suggest creating a single (i.e., unified) feature vector based on a user's communication interest, on network attributes, and on application attributes, such that the single feature vector comprises features extracted from a plurality of different types of sources, as recited by Applicants' independent claim 2. Solotorevsky fails to bridge this gap in the teachings of Harmer, George, and Schuetze. As such, the Applicants respectfully submit that independent claim 2 is also not unpatentable over Harmer in view of George and Schuetze and further in view of Solotorevsky.

Claim 5 depends from independent claim 2 and recites at least all of the features recited in independent claim 2. As such, and for at least the reasons stated above with respect to independent claim 2, the Applicants respectfully submit that claim 5 is also not unpatentable over Harmer in view of George and Schuetze and further in view of Solotorevsky and is allowable.

Moreover, the Examiner acknowledges that the "combined teachings of Harmer/George/Schuetze do not explicitly teach wherein the method comprises the steps of: forming network delay maps and on the forward capacity maps from the obtained network attributes, and such that clustering is based on the formed network delay maps and on forward capacity maps" (Office Action, Page 16). The Examiner alleges, however, that this feature is taught by Solotorevsky.

The Applicants note that Solotorevsky is the U.S. National Phase entry of Patent Cooperation Treaty International Publication No. WO 03/043253 (published May 22, 2003, hereinafter "Solotorevsky 2"). In a previous Office Action, the Examiner noted that "[t]he combined teachings of Solotorevsky [2]/George/Cetintemel do not explicitly teach wherein the method comprises the steps of forming network delay maps and on the forward capacity maps from the obtained network attributes, and such that clustering is based on the formed network delay maps and on forward capacity maps," (See, Office Action dated November 24, 2009, Pages 15-16). If Solotorevsky 2 does not teach these features (alone or even in combination with other references), then it follows that Solotorevsky also cannot teach these features (since, as discussed above, Solotorevsky is merely the U.S. National Phase entry of Solotorevsky 2). Thus, the Applicants respectfully submit that claim 5 is not unpatentable over Harmer in view of George and Schuetze and further in view of Solotorevsky for these additional reasons.

In light of the above, the Applicants respectfully request that the rejection of claim 5 under 35 U.S.C. §103 be withdrawn.

#### F. Claim 10

Claim 10 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Harmer in view of George and Schuetze and further in view of the Tang et al. patent application (United States Patent Application Publication No. 2005/0076137, published April 7, 2005, hereinafter "Tang"). In response, the Applicants have amended independent claim 2, as discussed above, in order to more clearly recite aspects of the present invention.

As discussed above, Harmer in view of George and further in view of Schuetze fails to disclose or suggest creating a single (*i.e.*, unified) feature vector based on a user's communication interest, on network attributes, and on application attributes, such that the single feature vector comprises features extracted from a plurality of different types of sources, as recited by Applicants' independent claims 2 and 26. Tang fails to bridge this gap in the teachings of Harmer, George, and Schuetze. As such, the Applicants respectfully submit that independent claim 2 is also not unpatentable over

Harmer in view of George and Schuetze and further in view of Tang.

Claim 10 depends from independent claim 2 and recites at least all of the features recited in independent claim 2. As such, and for at least the reasons stated above with respect to independent claim 2, the Applicants respectfully submit that claim 10 is also not unpatentable over Harmer in view of George and Schuetze and further in view of Tang and is allowable.

#### **G. Claim 25**

Claim 25 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Harmer in view of Schuetze and further in view of the Posey, Jr. patent n (United States Patent No. 7,184,444, issued February 27, 2007, hereinafter "Posey"). In response, the Applicants have amended independent claim 1, as discussed above, in order to more clearly recite aspects of the present invention.

As discussed above, Harmer in view of Schuetze fails to disclose or suggest creating a single (*i.e.*, unified) feature vector based on a user's communication interest, on network attributes, and on application attributes, such that the single feature vector comprises features extracted from a plurality of different types of sources, as recited by Applicants' independent claim 1. Posey fails to bridge this gap in the teachings of Harmer and Schuetze. As such, the Applicants respectfully submit that independent claim 1 is also not unpatentable over Harmer in view of Schuetze and further in view of Posey.

Claim 25 depends from independent claim 1 and recites at least all of the features recited in independent claim 1. As such, and for at least the reasons stated above with respect to independent claim 1, the Applicants respectfully submit that claim 25 is also not unpatentable over Harmer in view of Schuetze and further in view of Posey and is allowable.

#### **H. Claim 23**

Claim 23 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Harmer in view of Schuetze and further in view of Grimm. In response, the Applicants have amended independent claim 1, as discussed above, in order to more clearly recite aspects of the present invention.

As discussed above, Harmer in view of Schuetze fails to disclose or suggest creating a single (*i.e.*, unified) feature vector based on a user's communication interest, on network attributes, and on application attributes, such that the single feature vector comprises features extracted from a plurality of different types of sources, as recited by Applicants' independent claim 1. Moreover, the Examiner acknowledged in a previous Office Action that Grimm (in combination with George) "do[es] not explicitly teach the steps of: forming a single feature vector based on the communication interest, network attributes, and application attributes, wherein the single feature vector is used to cluster the user with one or more other users based on similarly-formed single feature vectors associated with one or more other users" (Office Action dated April 2, 2009, Page 5). Thus, Grimm fails to bridge the gap in the teachings of Harmer and Schuetze. As such, the Applicants respectfully submit that independent claim 1 is also not unpatentable over Harmer in view of Schuetze and further in view of Grimm.

Claim 23 depends from independent claim 1 and recites at least all of the features recited in independent claim 1. As such, and for at least the reasons stated above with respect to independent claim 1, the Applicants respectfully submit that claim 23 is also not unpatentable over Harmer in view of Schuetze and further in view of Grimm and is allowable.

In light of the above, the Applicants respectfully request that the rejection of claim 23 under 35 U.S.C. §103 be withdrawn.

#### **I. Claim 21**

Claim 21 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Harmer in view of Schuetze and further in view of Solotorevsky. In response, the

Applicants have amended independent claim 1, as discussed above, in order to more clearly recite aspects of the present invention.

As discussed above, Harmer in view of Schuetze fails to disclose or suggest creating a single (i.e., unified) feature vector based on a user's communication interest, on network attributes, and on application attributes, such that the single feature vector comprises features extracted from a plurality of different types of sources, as recited by Applicants' independent claim 1. Solotorevsky fails to bridge this gap in the teachings of Harmer and Schuetze. As such, the Applicants respectfully submit that independent claim 1 is also not unpatentable over Harmer in view of Schuetze and further in view of Solotorevsky.

Claim 21 depends from independent claim 1 and recites at least all of the features recited in independent claim 1. As such, and for at least the reasons stated above with respect to independent claim 1, the Applicants respectfully submit that claim 21 is also not unpatentable over Harmer in view of Schuetze and further in view of Solotorevsky and is allowable.

Moreover, the Examiner acknowledges that the "combined teachings of Harmer and Schuetze do not explicitly teach wherein the method comprises the steps of: forming network delay maps and on the forward capacity maps from the obtained network attributes, and such that clustering is based on the formed network delay maps and on forward capacity maps" (Office Action, Page 21). The Examiner alleges, however, that this feature is taught by Solotorevsky.

As discussed above, Solotorevsky is the U.S. National Phase entry of Patent Cooperation Treaty International Publication No. WO 03/043253 (published May 22, 2003, hereinafter "Solotorevsky 2"). In a previous Office Action, the Examiner noted that "[t]he combined teachings of Solotorevsky [2]/George/Cetintemel do not explicitly teach wherein the method comprises the steps of forming network delay maps and on the forward capacity maps from the obtained network attributes, and such that clustering is based on the formed network delay maps and on forward capacity maps," (See, Office Action dated November 24, 2009, Pages 15-16). If Solotorevsky 2 does not teach these features (alone or even in combination with other references), then it

follows that Solotorevsky also cannot teach these features (since, as discussed above, Solotorevsky is merely the U.S. National Phase entry of Solotorevsky 2). Thus, the Applicants respectfully submit that claim 21 is not unpatentable over Harmer in view of Schuetze and further in view of Solotorevsky for these additional reasons.

In light of the above, the Applicants respectfully request that the rejection of claim 21 under 35 U.S.C. §103 be withdrawn.

**V. CONCLUSION**

Thus, the Applicants submit that all of the presented claims fully satisfy the requirements of 35 U.S.C. §101 and 35 U.S.C. §103. Consequently, the Applicants believe that all of the presented claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues, it is requested that the Examiner telephone Kin-Wah Tong, Esq. at (732) 542-2280, x130 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,



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